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Marbled Murrelet Population Core Team
March 11, 1999

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*In Attendence:*

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|---|---|
| Jim Baldwin | Sherri Miller |
| Steve Beissinger | C.J. Ralph |
| Naomi Bentivoglio | Martin Raphael |
| Tim Max | Chris Thompson |

*I. Brief Budget Overview*
NB handed out a draft budget sheet to the team members for future discussion.

*II. Sampling Design - Target Population*

*A. Offshore Distribution*
SM started analyzing their data. CT will also look into this. SB also looked at CJ data for one year. Not much beyond 3000m. SB data found few beyond 1.5km. MR suggested a bathymetric depth as an alternative to distance offshore. Seems like bathymetry is not as straightforward, and may be more difficult to measure. MR suggested some combination of the two, whichever is less. Could also handle this in the sampling design. 3km encompasses all of Puget Sound water. All are viable options.

Three options for offshore distribution:
1. Offshore 100m to 3000m.
2. ==Water's edge to 5000m (was ultimately chosen by the group).==
3. Outer edge could be bathymetrically defined.

Recall SB data at the November 1998 meeting showed four different types of clusters pooling different data for different years:
1. More birds closer to shore with a relatively steep drop off
2. Less closer, peak further offshore, then steep drop off
3. Less closer, peak further offshore, then gradual drop off
4. Flat distribution offshore (fewer of these and have dropped them from further analysis)
They used a spline technique to deal with the peaks (which are difficult to deal with for logistic regressions).

We again discussed Model Based versus Design Based assessment of the distribution offshore defining the width of the reference population. This also would affect our stratification of the population and sampling within the strata.

1. Model Based - Using existing data, we would determine a probable offshore distribution. This model is weaker statistically because its not enough to know the function of the curve (i.e., shape), we need to know densities for a given area.

2. Design Based - Every year assess the offshore distribution for a given area. Likely would be

expensive to get representative samples for each area.

There is some degree of variation day to day, location to location, year to year. Day and year variation could swamp the location variation. MR also mentioned within the day variation. CT consistently sees birds further offshore in the afternoon.

*B. Along Shore Distribution*
SB handed out a packet of tables and graphs about along shore distribution called "Transect Length, Variability, and Power to Detect Marbled Murrelet Trends." They used 50m strip densities. Obtained a mean for each segment over 7-9 days within one year from which they determined Coefficients of Variation. Obtained range of CVs within a space over time. Note Theoretical versus Actual CV, along shore and offshore both have sources of variation. How do we articulate the problem?

Along Shore Options (see table below):
1. One inference, entire range - one population over range.
2. One inference, federal only - one population over range.
3. Different inferences by zone, entire range - subpopulations with independent inferences.
4. Different inferences by zone, federal only - subpopulations with independent inferences.
5. Different inferences by smaller units within zone over entire range.
6. Different inferences by smaller units within zone over federal only.

| | Sampling Frame (Sampled Population) | Pros/Cons | Cost Estimates |
|---|---|---|---|
| One Trend | Whole Coast | | |
| | Federal Coast | | |
| One Trend Per Conservation Zone | Each Zone | | |
| | Each Zone With Federal Lands | | |
| One Trend Per Subsection of Conservation Zone | Each Subsection | | |
| | Each Subsection With Federal lands | | |

SB notes Recovery Plan criteria for recovery is when you have stable or increasing populations in four of the six conservation zones. The Forest Plan monitoring program is the most logical arena to monitor for recovery. SB suggested two goals or target populations:
1. Define the target population to reflect land use.
2. Define the target population to help detect trends at the zone level.

*C. Sampling Layout - Sampling Units Placement/Orientation*
TM suggested we choose one of the Target Population Along Shore choices for our discussion so

==we chose one trend per zone to start==.  Discussed different transect lengths.  SB question about whether we need to worry about confining our transect length to what can be covered in one day? May reduce some of the variability.  ==Decided to start with 50 km lengths==.

Sampling Units Options:
1.  One nearshore transect parallel to shore (500m) = estimates an index.  (Some thought this could be a relative example to compare power to detect trends, others thought not.)
2.  Two fixed distance transects parallel to shore (one near, one far) = estimates an index.
3.  N Segments of length L placed at random distances parallel to shore.
4.     a.  Segments in K zones from shore with randomly allocated starting points and a fixed number/stratum.
        b.  Segments in K zones from shore with systematic placement among strata.
5.  N segments of length L oriented perpendicular to shore.
6.  Systematic Grid:
        a.  Relatively short segments starting from grid points, either perpendicular or parallel to shore.
        b.  Stratify samples per zone.
~~7.  Zigzag pattern through all zones.  For getting estimates from shore this might be good.~~ ==(Choice eliminated by the group)==.
8.  Fixed transect distances 1,2,...n distances along the entire coast plus intensive areas with sampling throughout the 0-500m.

These configurations need to be further defined including realistic parameters, consequences, etc. ==JB will write up 3, 4, and 5 for the group.  CJ will write up 1, 2, 6, & 8.==

MR raised a point that adding segments will reduce CV since you're essentially pooling.  Note the K bands wouldn't have to be the same width (e.g., could have 5 bands of 1000km each but lump the last two bands).

We again discussed an index versus mean density for an entire area.  Mean density for entire area will be extremely expensive.  The mean density for the population in a year can translate to population abundance.  NB feels that we need to develop a baseline in the beginning and track indices over time (e.g., are we witnessing an annual decline of three percent in a population of 50,000 or 5,000?).  TM feels that in the past we have gotten an estimate of the number or density at a particular distance, but our target population and sampling design determines the inference. (Note a subpopulation is a portion of the population to which you want to make a separate inference.)

*D.  Temporal*
We will proceed to work on this aspect of defining our target as we go along.

*III.  Next Meeting*
Scheduled at 8:00am, April 22, 1999 in Portland at the Duncan Plaza Building, Cowlitz Conference Room, 7th Floor.